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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,812	01/10/2002	Satoshi Seo	07977-292001-US5444	7853

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EXAMINER	
COLON, GERMAN	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/043,812	SEO ET AL.	
	Examiner	Art Unit	
	German Colón	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 56-80* is/are pending in the application.

4a) Of the above claim(s) *56-59* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 60-80* is/are rejected.

7)☒ Claim(s) *61-68 and 73-80* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 April 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/15/04,10/03/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 15, 2004 has been entered.

Response to Amendment

2. The Amendment, filed on November 15, 2004, has been entered and acknowledged by the Examiner.

Claim Objections

3. Claims 61-68 and 73-80 are objected to because of the following informalities:

Claims 61, 65, 73 and 77 are objected for reciting an improper Markush group. A Markush group recites members as being "selected from the group consisting of A, B and C." It is improper to use the term "comprising" instead of "consisting of." Ex parte Dotter, 12 USPQ 382 (Bd. App. 1931) and MPEP 2173.05(h).

Regarding claims 62-64, 66-68, 74-76 and 78-80, the claims are objected for their dependency status from claims 61, 65, 73, and 77, respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 77 and 80 are rejected under 35 U.S.C. 102(e) as being anticipated by Kido et al. (US 6,396,209).

Regarding claim 77, Kido discloses a light-emitting device comprising an organic light emitting element comprising:

an anode **2**;

a cathode **6**; and

an organic compound film **3,4,5** sandwiched between the anode and the cathode,

wherein the organic compound film comprises at least two compounds selected from the group consisting of an electron transporting compound (ETL) and an electron injecting compound (EIL),

wherein the two compounds selected are materials capable of undergoing vacuum evaporation (see at least Col. 3, lines 9-11, in view of the disclosed materials),

wherein the organic compound film comprises a region **5** in which the two compounds are mixed (see at least Col. 3, lines 46-50; and Col. 5, lines 39-41).

Regarding claim 80, Kido discloses the light-emitting devices being included in a display.

6. Claims 69, 72, 73 and 76 are rejected under 35 U.S.C. 102(e) as being anticipated by Wakimoto et al. (US 2001/0043044).

Regarding claim 69, Wakimoto discloses a light emitting device comprising an organic light emitting element comprising:

an anode **2**;

a cathode **7**; and

an organic compound film **3,4,5,6** sandwiched between the anode and the cathode,

wherein the organic compound film comprises a blocking compound **5** (HBL) an at least one compound selected from the group consisting of:

a hole injecting compound (HIL); a hole transporting compound (HTL); an ETL; and EIL (see paragraphs [0024]-[0025]);

wherein the blocking compound and the at least one compound are materials capable of undergoing vacuum evaporation, and

wherein the organic compound film comprises a region **45** in which the two compounds are mixed.

Referring to claim 73, Wakimoto discloses a light emitting device comprising an organic light emitting element comprising:

an anode **2**;

a cathode **7**; and

an organic compound film **3,4,5,6** sandwiched between the anode and the cathode,

wherein the organic compound film comprises at least two compounds selected from the group consisting of a HIL and a HTL (see paragraph [0027], lines 5-10),

wherein the two compounds selected are materials capable of undergoing vacuum evaporation, and

wherein the organic compound film comprises a region in which the two compounds are mixed (see paragraph [0027]).

Referring to claims 72 and 76, Wakimoto discloses the light-emitting devices being included in a display.

7. Claims 61, 64, 73 and 76 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujii et al. (US 5,674,597).

Referring to claims 61 and 73, Fujii discloses a light emitting device comprising an organic light emitting element comprising:

an anode **2**;

a cathode **5**; and

an organic compound film **3,4,6** sandwiched between the anode and the cathode,

wherein the organic compound film comprises at least two compounds selected from the group consisting of a HIL and a HTL (see Col. 3, lines 18-20; Col. 4, lines 62-64; and Col. 5, lines 26-30),

wherein the two compounds are capable of undergoing vacuum evaporation,

wherein the organic compound film comprises a region in which the two compounds are mixed, and

wherein the electric current versus electric voltage property of the organic light emitting element show a rectification property (see Fig. 4).

Referring to claims 64 and 76, Fujii discloses the light-emitting devices being included in a display.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 65 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 6,396,209) in view of Fujii et al. (US 5,674,597).

In regards to claim 65, Kido discloses the claimed invention (see rejection of claim 77) including a mixed region having a ETL and EIL materials. Said mixed region forms a gradient distribution which smoothens the potential step at the interface of the ETL and EIL layers. Kido is silent regarding the limitation of "wherein the electric current versus electric voltage property of the organic light emitting element show a rectification property".

However, Fujii discloses an OLED having a mixed region of organic layers, said mixed region having a gradient distribution which smoothens the potential step at the interface of the organic layers, and teaches this mixed region to have a rectification property when the electric current versus electric voltage are plotted, resulting in a reduced driving voltage necessary for emission and accordingly, in saving of electric power and operating costs (see Figs. 1, 2 and 4; and Col. 3, lines 6-10, 22-25 and 28-30). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a mixed region exhibiting a

rectification property when the electric current versus electric voltage are plotted, in order to obtain a device having a reduced driving voltage necessary for emission and accordingly, in saving of electric power and operating costs. Further, varying the gradient of the mixed region to obtain an optimum or workable value, is considered to be within the level of ordinary skill in the art.

In regards to claim 68, Kido discloses the light-emitting devices being included in a display.

10. Claims 1, 60, 61 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakimoto et al. (US 2001/0043044) in view of Fujii et al. (US 5,674,597).

In regards to claims 1 and 61, Wakimoto discloses the claimed invention (see rejection of claims 69 and 73) including a mixed region having either a HBL and at least one of EIL, ETL, HIL and HTL materials; or a HIL and HTL materials. Said mixed region forms a gradient distribution which smoothens the potential step at the interface of the organic layers. Wakimoto is silent regarding the limitation of "wherein the electric current versus electric voltage property of the organic light emitting element show a rectification property".

However, Fujii discloses an OLED having a mixed region of organic layers, said mixed region having a gradient distribution which smoothens the potential step at the interface of the organic layers, and teaches this mixed region to have a rectification property when the electric current versus electric voltage are plotted, resulting in a reduced driving voltage necessary for emission and accordingly, in saving of electric power and operating costs (see Figs. 1, 2 and 4; and Col. 3, lines 6-10, 22-25 and 28-30). Thus, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to provide a mixed region exhibiting a rectification property when the electric current versus electric voltage are plotted, in order to obtain a device having a reduced driving voltage necessary for emission and accordingly, in saving of electric power and operating costs. Further, varying the gradient of the mixed region to obtain an optimum or workable value, is considered to be within the level of ordinary skill in the art.

In regards to claim 60 and 64, Wakimoto discloses the light-emitting devices being included in a display.

11. Claims 2-3, 62-63, 70-71 and 74-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakimoto et al. or Wakimoto-Fujii, in view of Arai et al. (US 6,303,239).

Regarding claims 2-3, Wakimoto and/or Wakimoto-Fujii discloses the claimed invention except for the limitation of the mixed compounds being host and a light emitting compound is added as a guest.

However, in the same field of endeavor, Arai discloses an OLED having a mixed region of organic layers and teaches a light emitting compound being added as a guest with the purpose of varying the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device (see Col. 8, lines 31-35 and 44-50). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a guest to the organic mixed layer in order to vary the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device.

Regarding claims 62-63, 70-71 and 74-75, the claims are rejected over the reasons stated in the rejection of claims 2-3.

12. Claims 62-63 and 74-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Arai et al. (US 6,303,239).

Referring to claims 62-63, Fujii discloses the claimed invention except for the limitation of the mixed compounds being host and a light emitting compound is added as a guest.

However, in the same field of endeavor, Arai discloses an OLED having a mixed region of organic layers and teaches a light emitting compound being added as a guest with the purpose of varying the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device (see Col. 8, lines 31-35 and 44-50). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a guest to the organic mixed layer in order to vary the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device.

Referring to claims 74-75, the claims are rejected for the reasons stated in the rejection of claims 62-63.

13. Claims 66-67 and 78-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. or Kido-Fujii, in view of Arai et al. (US 6,303,239).

In regards to claims 66-67, Kido and/or Kido-Fujii discloses the claimed invention except for the limitation of the mixed compounds being host and a light emitting compound is added as a guest.

However, in the same field of endeavor, Arai discloses an OLED having a mixed region of organic layers and teaches a light emitting compound being added as a guest with the purpose of varying the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device (see Col. 8, lines 31-35 and 44-50). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a guest to the organic mixed layer in order to vary the wavelength performance of light emission, thereby shifting the wavelength to a longer wavelength, improving the intensity of light emission, and the stability of the device.

In regards to claims 78-79, the claims are rejected for the reasons stated in the rejection of claims 66-67.

Response to Arguments

14. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to German Colón whose telephone number is 571-272-2451. The examiner can normally be reached on Monday thru Thursday, from 8:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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